

DIS2023: XXX International Workshop on Deep-Inelastic Scattering and Related Subjects



Contribution ID: 232

Type: **Parallel talk**

A new statistical model for estimating PDF uncertainties

Wednesday, 29 March 2023 10:00 (20 minutes)

When performing fits to data using the popular χ^2 approach, uncertainty to fit parameters is determined by contours of $\Delta\chi^2 = T^2$, where the tolerance $T = 1$ corresponds to the 68% confidence level. PDF fits have to deal with the problem of having data sets, particularly from different experiments, that are in tension with each other. The traditional approach used by PDF fitting groups to accommodate any tension between data sets is to artificially increase the value of T . Here, we identify a new method of estimating the uncertainty when there is tension in the data. Specifically, we use a Gaussian Mixture Model (GMM) as a basis of our likelihood function. We demonstrate the properties and advantages of the GMM and compare it to the ad-hoc method of increasing the tolerance of $\Delta\chi^2$ in a toy model using pseudo-data.

Submitted on behalf of a Collaboration?

No

Participate in poster competition?

Primary author: MOHAN, Kirtimaan Ajaykant

Co-authors: YUAN, C.-P. (Michigan State University); YAN, Mengshi; Dr HOU, Tie-Jiun; LI, Zhao (Institute of High Energy Physics, Chinese Academy of Sciences)

Presenter: MOHAN, Kirtimaan Ajaykant

Session Classification: WG 1

Track Classification: WG1: Structure Functions and Parton Densities